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The effect was investigated of diadic, peer group discussion, and role-playing communication patterns on level of abstraction, length of response, and complexity of sentence structure in the speech of children from low socioeconomic environments in response to a verbal task using 2 levels of abstraction (objects and pictures of objects). Subjects consisted of 69 children (50 were predominantly Spanish-speaking), kindergarten through third grade, in a school for children of migrant workers in Leoti, Kansas. Significant differences were found between the three patterns of the proportion of word, phrase, and sentence responses. Evidence indicated that dimensions of the communication situation interact significantly with the speech response of the child. (JM)

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The Effect of Selected Communication Patterns on Level of Abstraction, Length, and Complexity of Sentence in Speech of Children

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Many of the criteria by which language deficiencies are measured may not be directly related to the speech-language development of the child. For example, a child who does not respond verbally to a request does not necessarily have a verbal deficiency. Factors in the stimulus situation, including the particular pattern in which the child is asked to verbalize may act to restrict the ability of the child to verbalize. Research has shown that adults who become functionally non-verbal when placed before an "audience" are able to utilize their verbal capacities when placed in a small group communication pattern. It is possible that the diadic teacher-pupil communication pattern used in the elementary classroom and many observational studies acts to restrict the verbal capacities and abilities which the child has developed by the time he enters school. In order to allow the child the greatest opportunity to utilize his verbal abilities, the communication pattern which least restricts the verbalization of the child should be utilized.

This study investigates the effect of the diadic, peer group and role-playing communication patterns on the level of abstraction, the length of response, and the complexity of sentence structure in the speech of children from low socio-economic environments in response to a verbal task using two levels of abstraction (objects and pictures of objects). Contrary to a previous study by Sigel et al., no significant differences were found between responses to objects and pictures of objects. No significant differences were discovered between the diad and discussion on levels of abstraction. A structural relationship was found to exist between levels of abstraction and the role-playing pattern. Differences significant at the .05 level were found between the three patterns on the proportion of word, phrase and sentence responses. There are significantly greater proportions of sentence and phrase responses in discussion and role-playing patterns than in diads, and a significantly greater proportion of single-word responses under the diad. Length of speech response also varies significantly over the communication patterns and is closely related to the complexity of speech response.

Subjects for this study were 69 children of migrant families, kindergarten through third grade in a school for children of migrant workers, Leoti, Kansas.

The evidence indicates that dimensions of the communication situation interact significantly with the speech response of the child. Many of the criteria for determination of verbal destitution and underdeveloped language due to unconceptualized experience which are based on the non-response of the child to a specified verbal stimulus should be re-examined. The failure of a child to verbalize and the nature of verbal responses under specified conditions are highly confounded with the structure of the observational situation. Future studies on the level of abstraction and the complexity of speech response should clearly indicate the communication pattern employed and generalizations should be limited to that particular pattern.

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I. Introduction and Specific Aims:

The problem of identifying and treating the language deficiencies of children of low socio-economic environments may be as much a function of the cultural and philosophical orientation of the observer as real language deficiency in the child. The Talent Development Project of the Center for School Experimentation at the Ohio State University, Columbus, under the direction of Dr. Alexander Frazier (3) has led in the identification of three language classifications which currently pervade the literature on language development. These classifications must be considered in any cogent analysis of the speech of children from low socio-economic environments. Following the framework of Frazier's study, it is possible to view the language problems of children from low socio-economic environments as falling into one of the following classifications:

a) True Verbal Destitution--usually related to a real impoverishment of verbal stimuli, cultural deprivation, or lack of association with material or cultural objects. The remedy for this problem is usually associated with provision of the child with material and cultural stimuli and providing or imposing upon the child a language to deal with such stimuli.

b) Underdeveloped Language--usually caused by unconceptualized experience. The remedy for this problem is frequently one the remedial approaches of the other classifications but tends toward treating the child as a problem of verbal destitution.

c) Full but Non-Standard Language--the child is usually viewed as having a fully developed language which is different from the language commonly used in the particular formal educational environment of the child. The remedy for this problem is most often related to developing a second language for the educational environment or modification of the original, non-standard language for the educational environment.

While there are unquestionably cases of true verbal destitution and underdeveloped language caused by unconceptualized experiences in children from low socio-economic environments, many of the criteria by which these language deficiencies are measured may not be directly related to the speech-language development of the child. In all studies reviewed by this investigator, the criterion for the determination of verbal destitution and underdeveloped language was ultimately the lack of response of the child under formal testing or

experimental conditions. The inference that the lack of a verbal response by a child to a specified stimulus situation is associated with either verbal destitution or underdeveloped language usually rests upon the philosophical bias of the observer rather than upon the empirical data. In the absence of empirical evidence that the non-response of the child was not related to external factors such as the observational situation itself, the conclusion that a child is verbally destitute or possesses an underdeveloped language caused by unconceptualized experience should not be made.

Let us examine a representative study for purposes of illustration. The study of Sigel, Anderson and Shapiro (10) is representative of the studies which approach the language deficiencies of children of low socio-economic environments as problems of verbal destitution and underdeveloped language caused by unconceptualized experience. They found the level of abstraction in verbal reports of Negro children to be related to socio-economic status. Children from low socio-economic environments responded less frequently and at a lower level of abstraction to pictures of objects than they did to objects themselves. This finding obviously has manifold implications for structuring the curricula of elementary schools in low socio-economic areas. Closer analysis of the data of the Sigel, Anderson and Shapiro is warranted. The study classified as non-conceptual those children who failed to respond to the verbal task. These children constituted almost 25% of the original experimental population. Although some of these children could verbally identify relationships between the stimulus objects, when they failed to respond within the experimental situation they were dropped from the experimental group as verbally non-conceptual.

Two observations lead us to re-examine the conclusion of this and similar studies. While the absence of a response by a child certainly does not indicate that he possesses a full but non-standard language, there is little or no empirical evidence to indicate that the absence of a response is related to the speech-language development of the child. Secondly, there is no evidence in the Sigel study or studies which arrive at similar conclusions that the non-response is not created by the experimental or observational conditions themselves.

What are the variables which are involved when the child from a low socio-economic environment attempts to utilize his verbal capacities in the formal classroom or structured experimental and observational settings? Perhaps a more critical question is what variables in the classroom or the observational setting act to restrict the utilization of the verbal capacities which the child brings with him. While much research has focused upon the conditions of learning, i.e. formal acquisition of knowledge of content, or upon the effect of the teacher and teacher's status as variables, there has been little research upon the communication pattern of the stimulus situation itself as a relevant variable in the education process or in education research.

From the present knowledge of the speech communication process, it would appear that one of the critical variables in the measurement of the overall development of the speech of the child from a low socio-economic environment is the particular communication pattern within which he is expected to verbalize in the classroom situation. It is a common observation that the communication pattern often interferes with adult

verbalization to the point of complete incapacity. An adult placed before a group may get "stage fright" to the point where his verbal capacities appear to abandon him. It has also been observed that the adult's ability to use his verbal capacities is related to the communication pattern (1) rather than to speech, language or verbal development. An adult who appears to lose his verbal capabilities when speaking before an audience may have no difficulty when speaking within the communication pattern of a small group (2).

It is quite possible that similar relationships are present in the communication patterns in which we place children in the expectation that they will "verbalize freely" and to the limits of their speech-language development. Shaw (8) however has identified a phenomenon in children in elementary school which is similar to the "stage fright" phenomenon of the adult. He has termed this phenomenon speech fright and has demonstrated that at least 20% of the children in elementary school populations are considerably affected by it. Shaw has found no apparent relationship between speech fright and speech ability. This finding becomes particularly significant when related to our previous discussion. The normal distribution of children who are greatly affected by speech fright could account for the 25% of the original experimental population who did not respond to the verbal task in the Sigel et al. study which were subsequently catgeorized as non-conceptual.

The phenomenon of speech fright in children has not been examined in relationship to socio-economic status or communication patterns. It may well be, however, that certain communication patterns wither enhance or block the child's ability to verbalize abstract relationships. It is possible that a communication pattern which is alien to the socio-economic culture of the child will be detrimental to the overall educability of the child. In other words, children from a low socio-economic environment may react differentially to the communication pattern of a stimulus situation. This differential reaction may be expected to be manifest in the level of symbolization of the speech of the child, the length of his speech response, and the complexity of sentences spoken. The differential effects created by the communication patterns of the classroom situation may also vary with the child's preference for the language spoken in the classroom.

Present research indicates that the social environment of the child of a low socio-economic environment is more accurately characterized by peer relationships than diadic, adult-child relationships (6). Findings that low-income students do better in larger class sizes and fewer study halls (4) may be indicative of the need for peer or role reinforcement by the child of low socio-economic environments. It is therefore hypothesized that the communication patterns of the peer group discussion and role playing may serve to provide the reinforcing atmosphere which will allow the child to utilize verbal capacities which he may already have developed, and that the diadic teacher-pupil or experimenter-child relationship may act to restrict the utilization of such capacities.

If the child from a low socio-economic environment enters the formal educational system with a verbal difference rather than a verbal deficiency, the primary task of the teacher may be to condition the existing language rather than to create a language for a non-languaged child. Likewise, the research upon which the educational system is structured has a responsibility to account for the variables

which are related to verbal response by the child but may not be related to the level of speech-language development. A factor of major importance then is the discovery of means to exploit the verbal capacities which the child has already developed by the time he enters formal education, and to create situations within the formal structure of the elementary school which will direct those verbal capacities into maximum development of the child's overall proficiencies in speech communication.

Using as subjects children of migrant workers in selected communities in Western Kansas, the specific research aims of this study were:

1. To measure the effect of diadic, peer group discussion and role playing communication patterns upon the level of abstract symbolization in their speech;

2. To measure the effect of diadic, peer group discussion and role playing communication patterns upon the length of speech response of children of varying linguistic preference for English;

3. To measure the effect of diadic, peer group discussion and role playing communication patterns upon the complexity of verbal response in their speech.

The major hypotheses of the study were:

It was hypothesized that the findings of Sigel, Anderson and Shapiro would be confirmed and that there would be a significantly lower number of response and responses of lower levels of abstraction to pictures of objects than to objects themselves, regardless of the communication pattern.

It is further hypothesized that:

The level of abstraction of the responses both to actual objects and pictures of objects will be significantly higher in the peer group and under the role playing conditions than in the diad;

The length of responses both to actual objects and pictures of objects will be significantly higher in the peer group and under the role playing conditions than in the diad; and

The complexity of responses both to actual objects and pictures of objects will be significantly higher in the peer group and under the role playing conditions than in the diad.

For the purposes of clarity, the specific hypotheses tested are presented only in the sections relating to the discussion of the major variables with their accompanying data and analyses.

Only null hypotheses were tested for acceptance or rejection. A null hypothesis was rejected when it did not meet the .05 level of confidence. In some cases where a null hypothesis indicated no significant difference in the variance of the means of two populations, the variance was examined for trend. The existence of trends may give indication of variables of interest to future research and may frequently aid in the interpretation of any given data.

II. Methods of Procedure:

The variables of major interest were the effect of the communication pattern upon various dimensions of the speech of children from low socio-economic environments. Three communication patterns were selected for study. The diad was one teacher (or experimenter) talking with one child. The peer group discussion consisted of a teacher sitting in a semi-circle with four children participating in discussion. The role playing situation involved two children with the teacher as a passive observer.

The Verbal Task:

The verbal task was adapted from the study of Sigel, Anderson and Shapiro (10). Regardless of the particular communication pattern used, each S was shown 10 objects, selected from his socio-economic environment and pretested within the population to insure that the S could identify the object by name. Each S was then asked, "Which of these objects go together?" S's would select from the objects two or more items which they said "went together." The S's were then asked to verbalize in response to the question, "Why do these things go (or belong) together?" The response to why the objects went together was considered the critical response and constituted completion of the verbal task.

The Stimulus Objects:

Twenty objects from the socio-economic environment of the child were selected to form a pool of stimulus objects. Each object was one with which each S was familiar. The objects were small enough to be handled easily and reflected various shapes, colors and functions. The specific items used were: a book, a crayola, a chalk eraser, chalk, a red 2" rubber ball, a toothbrush, a spoon, scissors, a fork, a black pocket comb, a red canvass shoe (a tennie), a package of Winston cigarettes, toothpaste, an artificial carnation flower, a bar of soap, a paper cup with handles, a red cap, a Tab bottle and an aritifical apple.

Previous research (10) has demonstrated a differential response by children of low socio-economic groups between objects and pictures of objects. This research indicates that under the experimentor-subject (teacher-pupil) diad, there are significantly fewer verbal responses by children from a low socio-economic environment to pictures of objects than to objects themselves. In the previous study, 25% of the children observed did not give verbal responses to the groupings of pictures of objects although they could verbalize the relationships between the objects themselves. It was suggested by the study that these S's were unable to verbalize because the picture-word relationship was more abstract than the object-word relationship. Inability to verbalize the picture-word relationship was interpreted as a deficiency in ability to abstract and formulate symbolic relationships into speech. We suggest that there may be an interaction between the level of abstraction of the stimulus object (objects and pictures) and the communication pattern which will account for the variance in the frequency of the S's to respond and the level of abstraction upon which they responded.

Because of the apparent differential effects of level of abstraction of the stimulus object with socio-economic status, two levels of stimulus

objects were used. Each of the objects was photographed and actual-sized black and white photographs of the stimulus objects formed a pool of twenty pictures of objects.

Both objects and pictured of objects were used in every combination with the three communication patterns creating six observational conditions. In order to minimize familiarity with the stimulus objects and to maintain subject interest, the 10 objects for presentation were randomly drawn from a pool of 20 stimulus objects for each of the observational conditions.

The Communication Patterns:

Where possible, each S was observed on the verbal task under each of three communication patterns--the diad, peer group discussion, and role playing--using both objects and pictures of objects as stimulus objects. Because of the migrant nature of the population and because the various combinations were randomized over a 4 week observational period, it was not possible to secure observations on every child in every combination of variables.

The diad pattern was comprised of one S and the teacher (or experimenter) completing the verbal task. In this pattern the E would sit opposite the S with the objects between them. The E would ask "What objects go together? Which of these things belong together?" When the S had selected at least two stimulus objects which "went together" the E would ask, "Why do these things go together?" The interchange was completely under the control of the E engaged in the situation at the time. It was assumed that the interchange would be representative of the diadic relationships normally expressed between the E and the S in other classroom activities.

The peer group communication pattern consisted of 4 S's and an E. Within the group pattern each S was encouraged to complete the verbal task as a part of his overall participation in the discussion group. Ideally, the role of the E was to encourage the participation of all group members while not actively participating in the discussion other than to aid the S's to continue a verbal interaction. E's, however, reflected their normal teaching idiosyncrasies. The degree of E participation varied as widely as their teaching styles with some actually preventing discussion on the part of some children. This will be discussed later in the report.

We were not concerned with a so-called "cheater" effect in which an S produces (copies) a response which is not his own thought or observation. In some instances one S would be repeating the observations made by another S in the discussion situation. The nature of the dependent variable largely discounted this factor. We were not concerned with learning or knowledge but with the <u>verbalization</u> of the relationships between selected objects. It is assumed that if the S does not possess the level of abstract symbolism in his communication repertoire, he can not verbalize that abstraction. If he does verbalize the abstract symbolization under the group pattern, the observation to be made is that the S is capable of verbalizing at that level of abstraction, at that particular level of verbal complexity and for that length of time.

In the role playing pattern of communication each S was asked to enact a role with another S. This usually took, the form of one of the S's playing store with the other S coming to buy something and talking about the stimulus objects. The E was present but rarely participated in the interaction after establishing the initial roles.

Over the period of observation we attempted to observe each S under six conditions:

a) actual objects, diad
b) actual objects, peer group discussion
c) actual objects, role playing
d) pictures of objects, diad
e) pictures of objects, peer group discussion
f) pictures of objects, role playing

It was not possible to pre-determine which S would appear under which condition on a given day because of the migrant nature of the population. Therefore, S's were assigned to the individual conditions on the basis of which S was present on a given day and whether the S was eligible to appear under that condition, i.e. if he had not already appeared under the particular combinations being observed on that day. The combinations of objects, the combinations of pictures of objects and the order of combinations of communication patterns were randomized. The assignment of S's within the conditions were "self-selected" as true randomization of S's could not be controlled.

The Observational Setting:

The study was run in conjunction with the school for children of migrant workers in Leoti, Kansas. The school, funded by the Office of Economic Opportunity, is a day care and remedial education center for children, kindergarten through fourth grade, whose migrant parents must spend their days in the fields of Western Kansas. The children are enrolled for a maximum of 9 weeks. The educational objectives of the school are limited primarily to adjusting the children to the classroom situation, developing proficiencies in English and oral communication in English, and teaching basic health and personal hygiene.

The observational conditions were established as a part of the classroom activity during the last four weeks of the school, July 1 through August 2, 1968. Prior to the beginning of data collection, each of the teachers was informed of the general purposes of the study and their function as participant experimenters. The observational conditions were incorporated into the normal classroom activities and were readily accepted as a part of the daily in-class routine. Where possible two sets of observations were collected at the same time. Thus, the experimenter might be in the back of the room with a group discussion situation while the teacher serving as another experimenter might be at front of the room in a diad or role playing situation. The rest of the class continued their activities as usual under the supervision of a Spanish-speaking teacher's aid. The conditions under which data was collected varied as the classroom atmosphere and styles of the teachers varied. In rooms where the teacher insisted on strict order and silence when she was working with individuals or small groups of pupils, the observational situations were considered to be the same as when the teacher was working with reading, spelling, or any of the other activities

and quiet order prevailed. In other rooms, the levels of activity and noise was normally high and these conditions prevailed for the observational conditions. Every effort was made to collect data under actual classroom conditions.

Subjects:

A total of 69 S's from the kindergarten through fourth grades were observed. 50 S's were predominantly Spanish speaking children. 19 S's were predominantly English speakihg and were in the school for remedial reading and language training. Assignment of S's to grade level within the school was based upon mixed criteria. Consequently, no meaningful comparisons with regard to grade levels can be made with other populations. Because the population was migrant, each S does not appear under every condition.

Data Collection and Scoring:

The diadic and role playing situations were recorded on audio magnetic tape. During the sessions the microphone was placed on the table between the teacher and the child or in the middle of the group. The discussion situations were recorded on video-tape to facilitate accurate identification of the individuals speaking. In these situations the television camera "closed" the semi-circle of the small group setting. The camera was placed several feet away from the actual discussion situation and the microphone was placed in the same manner as the regular audio microphone was placed in the other patterns. All equipment was set-up each day while S's were in another room taking naps or eating in order to minimize the possible confusion created by the presence of the equipment. Other than initial curiosity about procedure, there was no visible evidence that the S's focused their attention on either of the recording devises or were unusually distracted by their presence.

All tapes were scored at the Communication Research Laboratory of the Department of Speech Communication, State University of New York at Buffalo. At the beginning of each situation the teacher identified each S and the S's named the objects or the pictures of objects used as stimulus objects. Scoring did not begin until the completion of this standardized procedure. The time scoring was done by stopwatch. Spot checks in which randomly selected sections of tape were rescored on all variables were conducted throughout the study and at the end of the scoring to check the scoring reliability.

Data was analyzed through univariate and multivariate linear estimation and tests of hypotheses using an exact least-squares analysis. The number of observations per cell was disproportionate. Subjects were considered to be nested in each of the six combinations of communication patterns and picture-object conditions.

Prior to statistical analysis, the data across the various levels of each variable were converted to simple percentages, e.g. for S_1 the complexity of responses were distributed across the levels of the factor with 25% of the responses being words, 50% of the responses being phrases, and 25% of the responses being sentences. The estimation and analysis is based upon single-degree of freedom planned contrasts. Two separate sets of contrasts were performed on the data. A simple contrast in which all levels but one of a given factor were contrasted with the one omitted

is reported here unless otherwise noted. Deviation contrasts, in which all but the last level of a given factor were compared to the mean of all the levels of the factor were also computed. Because there were no significant differences in the analyses provided by the two methods, only one is reported.

Where both the multivariate and univariate F-ratios exceeded the .05 level of confidence, ordered comparisons of means was made employing the Tukey (a) method summarized by Winer (11). The critical value in these tests was computed using

$$q=\sqrt{MS_{error}/\bar{n}}\; q_{1-a}(r,df).$$

A summary table of the cell-row means is provided in Table I in the Appendix. A summary of the wintin cells variance used as the error term for comparisons is also provided there in Table III. Table IV is a summary of the sample correlation matrices for the seven variables.

III. The Effect of Diadic, Peer Group Discussion and Role-Playing Communication Patterns on the Level of Abstract Symbolization:

Two kinds of abstract symbolization were of interest in this analysis: the levels of abstraction in the response of the S's within the various stimulus situations, and the differential effects of stimulus objects and pictures of the stimulus objects, representing two levels of abstraction in the stimulus component of the verbal task.

The responses to the verbal task were recorded and scored as described above. Only responses directly related to the verbal task ("Why do these objects go together?") were scored. Extraneous comments which did not relate to the objects were omitted in this analysis. The responses were classified on a system derived from the work of Kagan, Moss, and Sigel (5) and Sigel (9). The responses were classified as follows:

I. Descriptive--Organized by the S on the basis of perceptual physical properties.

   A. Form--Organized using properties such as round, flat, and straight.
   B. Color--Organized using color dimensions.
   C. Structure--Based on descriptions designating specific intrinsic or inherent parts.

II. Relational-Contextual

   A. Functional--When objects are placed together on the basis of interaction in context, e.g. you can make noise by hitting top with bottle opener.
   B. Thematic--When objects are related to one another in story sequence, e.g. smoke a cigarette while you drink coffee from a cup.

III. Categorial

   A. Functional--When objects are placed in a relationship which is the basis for adult groupings but where a functional reason is stressed, with all items subsumed under one function.
   B. Class Label--When one term is used to define all objects, e.g. toys, eating things, "used for writing."

The analysis matrix did not allow for inclusion of the sub-categories under each of the major headings. Each of the sub-classifications was compressed into a single major level. Percentages were then calculated on the portion of total scores within a major classification.

Hypothesis 1: It was hypothesized that the levels of abstraction in the speech of children would vary with the communication pattern:

1(a): that the group discussion pattern would produce a higher level of abstraction than the diad;

1(b): that there would be a significantly greater number of responses under the discussion and role-playing patterns than under the diads.

A design problem arose in the gathering of data. Either because of the nature of role-playing or because of the level of language facility of the children used as S's, role-playing results in uniform and almost complete response at the Relational-Contextual level of abstract symbolization. At the date of this report this data has not yet been evaluated as it requires special treatment and methods of scoring for analysis. Two summaries of the contrasts are presented below. Tables A-1 and A-2 incorporate into the matrix the role-playing cells scored as zero; Table A-3 omits them from the matrix.

TABLE A-1
GRAND MEAN

F-Ratio For Multivariate Test of Equality of Mean Vectors= 311.0469

D.F.= 3 And 281.0000 P Less Than .0001

VARIABLE	HYPOTHESIS MEAN SQ	UNIVARIATE F	P LESS THAN
1 Descrip.	6.2039	70.7385	.0001
2 Rel-Con	31.2691	258.9252	.0001
3 Categor.	1.0724	32.8422	.0001

Degrees of Freedom for Hypothesis= 1
Degrees of Freedom for Error= 283
Error Term is (within cells) see: Variance, Table III, Appendix

TABLE A-2
VARIANCE OF DIAD, DISCUSSION AND ROLE PLAYING OVER 3 LEVELS OF ABSTRACTION

F-Ratio For Multivariate Test of Equality of Mean Vectors= 66.3954

D.F.= 6 And 562.0000 P Less Than .0001

VARIABLE	HYPOTHESIS MEAN SQ	UNIVARIATE F	P LESS THAN
1 Descrip.	1.7440	19.8852	.0001
2 Rel-Con.	8.8036	72.8981	.0001
3 Categor.	.3908	11.9668	.0001

Degrees of Freedom for Hypothesis= 2
Degrees of Freedom for Error= 283
Error Term is (within cells) see: Table III, Appendix

TABLE A-3
VARIANCE OF DIAD AND DISCUSSION OVER 3 LEVELS OF ABSTRACTION

F-Ratio For Multivariate Test of Equality of Mean Vectors= .1185

D.F.= 2 And 180.0000 P Less Than .8883

VARIABLE	HYPOTHESIS MEAN SQ	UNIVARIATE F	P LESS THAN
1 Abstra.	.0003	.0024	.9607
2 Abstrb.	.0288	.1524	.6967

Degrees of Freedom for Hypothesis= 1
Degrees of Freedom for Error= 181
Error Term is (within cells)

In examining the data of Table A-3 it appears that the null hypothesis cannot be rejected at the .05 level of confidence. The evidence indicates that Hypothesis 1 cannot be accepted as there is no statistically significant indication that there are differences between the means of the communication patterns with regard to level of abstraction. Analyses of Table A-2 and the correlation matrices in Appendix, Table IV provides indications of important relationships existing within the matrix which will be discussed below.

Hypothesis 1(b) could not be tested with the present scoring method. A graphic analysis of the data related to the frequency of response under the various combinations of communication pattern, level of abstraction, picture-object, and grade levels is presented below in Tables A-4 and A-5.

Table A-4 reflects the expected distribution of frequencies of response over the levels of abstraction by grade. Children in the kindergarten and sub-first grades of this population show higher frequencies of response at the descriptive level of abstraction than at the relational-contextual or the categorical levels. In the first, second, and third grades the functional dimensions of language become more dominant in the speech responses of the child. By the third grade, the categorical dimension of language appears not to be highly utilized. Investigation should be undertaken to determine whether that dimension of language is actually undeveloped at this stage or whether the level is developed but largely unused.

Table A-5 shows the relationship between the frequencies of response for both the diad and the discussion over grade levels. The high degree of difference between the diad and discussion at the second grade level may be accounted for by the great length of time the teacher spent with the children in the diadic situation. The class was small, the teacher displayed a marked preference for diadic over discussion patterns, and the investigators had to exert great pressure to end the diadic observation situations. The teacher would have proceded at greater length had she not been stopped. Despite the influence of the investigator, some of the diad sessions ran beyond the allotted time.

TABLE A-5

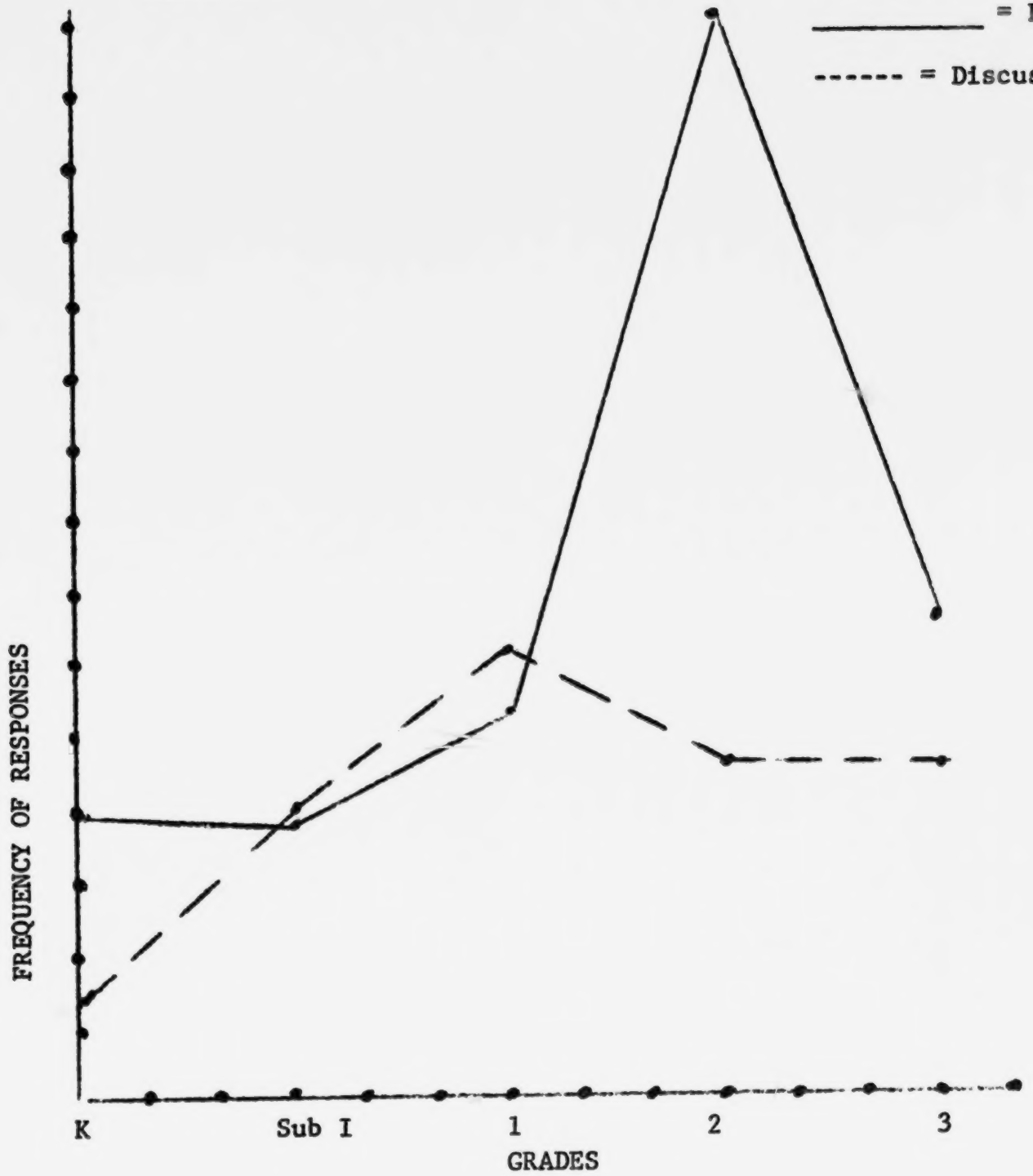
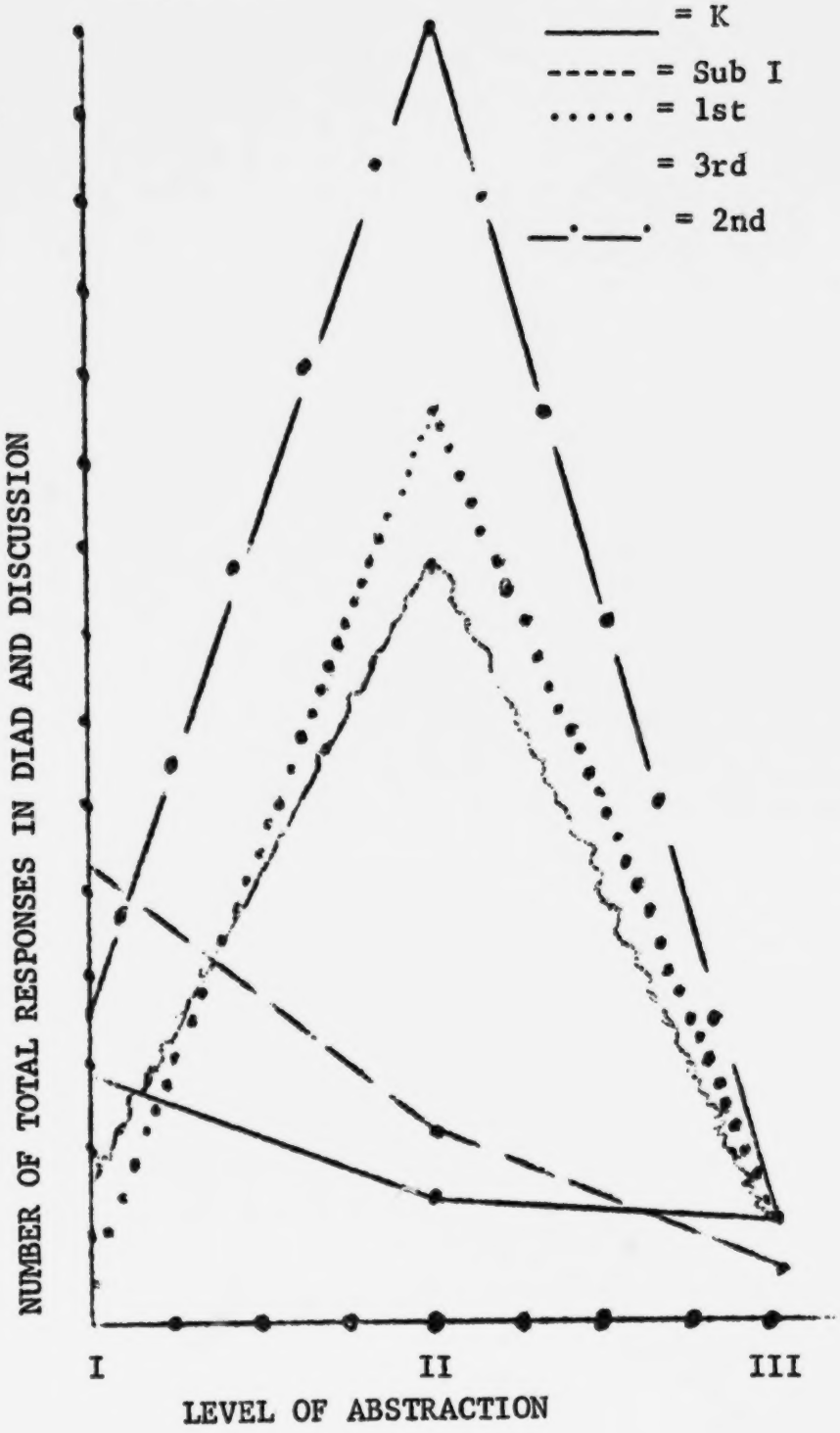


TABLE A-4



Hypothesis 2: It was hypothesized that there would be a statistically significant difference between the mean of the responses to objects and the mean of the responses to pictures of objects; and

2(a) that the level of abstraction in response to objects would be significantly higher than in the response to pictures of objects;

2(b) that there would be a significant difference in the complexity of abstract responses favoring the actual objects over the pictures of objects;

2(c) that there would be a significant difference in the length of response between actual objects and pictures of objects.

The summary of the contrasts of the levels of objects-pictures over the levels of abstraction is presented in Table A-6.

TABLE A-6
VARIANCE OF OBJECTS-PICTURES OVER 3 LEVELS OF ABSTRACTION

F-Ratio For Multivariate Test of Equality of Mean Vectors= .2764

D.F.= 3 And 281.0000 P Less Than .8424

VARIABLE	HYPOTHESIS MEAN SQ	UNIVARIATE F	P LESS THAN
1 Descrip.	.0446	.5088	.4763
2 Rel-Con.	.0470	.3889	.5334
3 Categor.	.0057	.1739	.6770

Degrees of Freedom for Hypothesis= 1
Degrees of Freedom for Error= 283
Error Term is (within cells) see: Table III, Appendix

From the data summarized in Table A-6 it appears that the mean of the presentations using objects does not differ significantly from the mean of the presentations using pictures. The null hypothesis cannot be rejected. This finding contradicts the findings of Sigel, Anderson, and Shapiro (10) who reported a difference in the response pattern between actual objects and pictures of objects as the verbal stimuli.

Data related to Hypothesis 2(b) is summarized in Table A-7.

TABLE A-7
VARIANCE OF OBJECTS-PICTURES OVER 3 LEVELS OF RESPONSE COMPLEXITY

F-Ratio For Multivariate Test of Equality of Mean Vectors= 1.5772

D.F. = 2 And 282.0000 P Less Than .2084

VARIABLE	HYPOTHESIS MEAN SQ	UNIVARIATE F	P LESS THAN	STEP DOWN F	P LESS THAN
1 Word	.5816	2.0964	.1488	2.0964	.1488
2 Phrase	.0550	1.5355	.2164	1.0576	.3047

*

Degrees of Freedom for Hypothesis= 1
Degrees of Freedom for Error= 283
Error Term is (within cells)

*The responses are computed in percentages with all rows equal to 1.000. The sentence component is included in the mean of the contrast but is also equal to 1.000-Sum of Words and Phrases.

Analysis of the data in Table A-7 indicates that the null hypothesis cannot be rejected with the .05 level of confidence. There appear to be no significant differences between objects and pictures of objects in the complexity of response pattern in the speech of the S's.

Data related to Hypothesis 2(c) is summarized in Table A-8.

TABLE A-8
VARIANCE OF TIME OF RESPONSE OVER OBJECT-PICTURE VARIABLES

Univariate Analysis of Variance for (Time)

Hypothesis Mean Sq.= .0232 F= 1.1798 with 1 and 283 Degrees of Freedom
P Less Than .2784

Error Term is (within cell)

Analysis of the data in Table A-8 indicates that the null hypothesis cannot be rejected with the .05 level of confidence. There appears to be no significant difference between objects and pictures of objects in the length of time to which the S's verbalized in their response to the stimuli.

Interpretation of Results: Hypotheses 1

The problem which is examined by Hypothesis 1 is whether the levels of abstraction of the responses of S's vary with variations in the communication pattern. While the differences which occurred do not appear to be statistically significant under the present research design, one should not conclude that there are no significant variations or relationships.

Two factors bear closer examination. The first of these is the relationship between the role-playing and levels of abstract symbolization. The very nature of a role-playing situation places a premium on certain types of language conceptualization. The S' playing a role, such as a

storekeeper or customer, has a decided tendency to utilize language which relates to contextual functions of objects. Thus, the level of symbolization which one gets in role-playing at all age and grade levels is predominantly Relational-Contextual. There are few if any Categorical relationships expressed. Children between the ages of 4 and 9 in this particular sample of the general population did not appear to express themselves in role situations in terms of categorical functions of objects. In other words, the child playing the role of the customer expressed himself in terms of the immediate use of the object within the situation rather than in terms of broad categories, e.g., "I need something to read--give me a book or paper, etc."

The direction of the results on the absence of variation of level of abstraction over the diad and discussion patterns is to be expected. The hypothesis that there would be a difference was included to test the extent of the variation over the diad-discussion patterns.

A more important finding regarding the relationship between the levels of abstraction and the various communication patterns lies in the observation that all subjects completed the verbal task, including kindergarten and sub-first grade students who are predominantly Spanish-speaking. Examination of the response patterns of the individual S's provide possible clues to the interpretation of the significance of this finding. In many of the observational settings, particularly when the S's appeared in the diad before appearing under any other condition, the response pattern would be extremely low. There would be few responses and they would be predominantly descriptive in nature. When the S appeared in the second observation situation, possibly using completely different objects, pattern and level of stimulus (perhaps pictures), the S would verbalize freely.

The only significant difference between the diad and discussion patterns is pictured in Table A-5. The frequency of responses in the diad was greater than the frequency of responses in the discussion. This result can readily be accounted for by the simple physical arrangement of having four S's responding in the discussion situation as opposed to a single S responding in the diad. Since there is no significant difference in the levels of abstraction across communication patterns, a teacher wishing to reinforce various levels of abstraction in the verbal response could utilize the discussion pattern instead of having to work with the S on a one-to-one basis. In large classes where time-per-pupil is at a minimum, effective utilization of group patterns may be expected to reflect the same level of abstraction in the verbalization as the diadic pattern of communication.

Interpretation of Results: Hypothesis 2

Sigel, Anderson and Shapiro (10) reported statistically different response patterns between situations which utilized actual objects and situations which utilized pictures of objects as the verbal stimulus. We were unable to locate significant variations between objects and pictures of objects.

Two possible explanations may account for the absence of this expected difference. First, the age of the subjects in the present study was probably significantly higher than in the Sigel et al. study. However, this study incorporated S's who were kindergarten and pre-school (age 4) as in the Sigel study, and no differences were discovered in responses to pictures and objects at that level.

A second explanation is that the response to the verbal stimulus is a function of familiarity with the verbal task. Initial responses (i.e., responses under the first stimulus situation in which an S may appear) may have varied between objects and pictures of objects. If that difference did appear, it was masked in the total analysis of variance and was not great enough to effect a difference between the mean of the responses to objects and the mean of the responses to pictures.

It is, of course, possible that differences between responses to objects and pictures of objects are a function of the stimulus situation Isolating the S from a "normal" environment, using an E who is strange to the S, or obtaining responses in a room where the S is the only child may all affect the response of the S. In cases of unfamiliarity with the experimental environment it may be easier for a child to respond to objects than to pictures. Objects are easier to manipulate than pictures, and such manipulation may produce certain feelings of security within the observational situation which allow the child to verbalize his response to objects and not to pictures of objects.

Because we could not discover differences in responses to objects and pictures of objects in these children of a low socio-economic environment, and because all subjects were able to complete the verbal task, we are led to the conclusion that much of what is classified as verbal destitution and underdeveloped language caused by unconceptualized experience is a function of the observational conditions rather than the language-speech development of the child. This conclusion is strongly reinforced by the data presented in the following three sections and is discussed more fully in the concluding section of the report.

IV: The Effect of Diadic, Peer Group and Role-Playing Communication Patterns on the Complexity of Speech Response

In this section the analysis of interest is the variation of the complexity of speech response over the three communication patterns. Complexity is operationally defined as three relatively discrete categories of response: single words, groups of words or phrases, and complete sentences. A speech response is operationally defined as the total connected or related response at any given time within the observational situation. With the scoring techniques used it was not possible to measure every word, phrase, and sentence. A speech response therefore was any single-word response, connected phrases, or connected sentences. If S said, "Black," the response would be scored as a word. If the child said, "Black. They go together because they are black," the entire response would be scored as a sentence, provided there was no time lag between the word and the sentence. If there was a time lag between the word and the sentence, the response would be considered to be two responses and would be scored as a word and a separate sentence response. It was not unusual that an S would get excited in his response and would begin with a sentence, intersperse a phrase or a single word and return to sentence structure. This would be classified as a sentence response in order to contrast this relatively complex response with the responses in which the S would simply utter three or four words.

Hypothesis 3. It was hypothesized that the complexity of response would vary over the three communication patterns, and

3(a) that there would be significantly more sentence responses in the group discussion and role-playing than in the diad, and

3(b) that under all three conditions the complexity of response to objects would be greater than the complexity of response to pictures of objects.

Data relevant to Hypotheses 3 and 3(a) are summarized in Table B-1.

TABLE B-1
Variance of Diad, Discussion and Role-Playing Over 3 Levels of Response Complexity

F-Ratio For Multivariate Test of Equality of Mean Vectors= 3.6362

D.F.= 4 And 564.0000 P Less Than .0001

VARIABLE	HYPOTHESIS MEAN SQ	UNIVARIATE F	P LESS THAN
1 Word	.5239	1.8886	.1532
2 Phrase	.1617	4.5141	.0118

Degrees of Freedom for Hypothesis= 2
Degrees of Freedom for Error= 283
Error Term is on Page 7

Inspection of the data in Table B-1 indicates that the null hypothesis may be rejected with the .05 level of confidence and the hypothesis is accepted on the basis of the multivariate analysis. The univariate analyses on the main effects of the word, phrase, and sentence variables

indicates no significant differences attributable to the word factor over the three communication patterns. However, the analyses do indicate significant effects for the other two variables and of the mean of the sum of the phrase and sentence variables contrasted against the mean of the complexity factor. (The latter data is not included in the above table.)

Tests of the critical differences between ordered means were made by the Tukey (a) method using

$$q = \sqrt{MS_{error/n}}\ q_{1-a}\ (r, df).$$

Under this test the critical differences appear only between the highest and lowest means on both variables. Thus, the critical difference between ordered means for phrases is between role-playing with objects and diads with pictures. The critical difference between ordered means for sentenses is between role-playing with pictures and diads with objects. Hypothesis 3(a) is partially confirmed by the analysis of the data. While all contrasts between the role-playing and discussion conditions and the diad did not significantly exceed the critical difference for this particular test, the evidence does indicate that the level of complexity is,under specified conditions, statistically more complex at these levels. It is suggested that this particular test of critical difference may be more rigorous than necessary and is more powerful than the comparable test which would be employed analyzing the subjects as crossed within the design as opposed to the nested design analysis reported here.

Hypothesis 3(b) is identical to Hypothesis 2(b). Data for that hypothesis is summarized in Table A-7.

Interpretation of Results: Hypothesis 3

An inspection of the observed cell means reported in Table I, Appendix, is useful in interpreting the results of this particular analysis. The total response pattern of each S was partitioned into percentages. The observed cell mean should represent an approximate percentage distribution across the levels of the factor. The direction in which the responses vary is readily seen by examining Table I. The highest mean word response is clustered under the two diad conditions. This indicates that in a diadic situation with a teacher or E, the child's responses will be characterized by word responses more than by sentence or phrase responses. A greater proportion of sentence and phrase responses occur when the child is allowed to verbalize under discussion and role-playing conditions.

It is difficult to tell what factors may be involved in this particular response pattern. It may be that the child feels more secure in a discussion or role setting than in the diad and expresses himself more freely and consequently more complexly. It is also possible that adults tend to dominate diadic stiuations more readily than they do the discussion and role situations. Many adults abhor silence like nature abhors a vacuum. When the child does not respond immediately to a stimulus question, the tendency is to fill the silence on the assumption that the child cannot verbalize a response. When the teacher or the adult is forced into the relatively passive role of observer, such as in the role-playing situation, the proportion of sentences used by the children in free verbalization in response to the verbal task becomes significantly

greater.

The principal investigator in this study believes that the particular statistical analyses used in the study do not reveal other differences which should be significant. Further analysis of this data, as well as further investigation of the findings indicated here, are being carried out by the principal investigator.

V. Effect of Diadic, Peer Group and Role-Playing Communication Patterns on the Length of Speech Response

In this section the analysis of interest is the variation of the length of speech response under each of the observational conditions. Length of speech response is calculated as a percentage of the total time the child verbalized under the experimental condition including pauses between words of sentences and phrases. Some E's talked longer to certain individuals than others. The ratio or percentage computation was adopted as a method of compensating for this factor.

Hypothesis 4: It was hypothesized that the length of responses would vary significantly between the peer group, diad,and role-playing conditions;and

4(a) that the length of response in the discussion and role-playing would be significantly greater than in the diad; and

4(b) that responses to actual objects would be greater than to pictures of objects.

Data related to Hypotheses 4 and 4(a) are summarized in Table C-1 and C-2. Data related to Hypothesis 4(b) is summarized in Table A-8.

TABLE C-1
GRAND MEAN

Univariate Analysis of Variance for (Time)

Hypothesis Mean Sq.= 2.6805 F= 136.4403 with 1 and 283 Degrees of Freedom
P Less Than .0001

Error Term is (within cells)

TABLE C-2
VARIANCE OF LENGTH OF RESPONSE OVER 3 LEVELS OF COMMUNICATION PATTERN

Univariate Analysis of Variance for (Time)

Hypothesis Mean Sq.= .0931 F= 4.7403 with 2 and 283 Degrees of Freedom
P Less Than .0095

Error Term is (within cells)

Analysis of the data in Table C-2 indicates that the null hypothesis may be rejected with the .05 level of confidence and that Hypothesis 4 may be accepted. There appears to be a statistically significant variation in the length of response over the three communication patterns.

The Tukey (a) test for the critical difference between ordered means was used to test Hypothesis 4(a). One significant contrast between ordered means was discovered. The contrast between diad with pictures and discussion with pictures is significant. The contrast is in the direction opposite of the predicted response. Hypothesis 4(a) would

be rejected on the basis of this test.

This comparison is not totally accurate or fair. In the diad the percentage of time the S spoke is approximately equal to the total time minus the time employed by E, or is distributed over a factor of 2. In the discussion the time S spoke is approximately equal to the total time minus the time employed by E, minus the time employed by 3 other S's, or is distributed over a factor of 5. The role-playing is distributed over a factor of 3. The exact weighting factor in these comparisons is left to the discretion of the reader, who may apply that factor to the mean percentages reported under the Time variable in Table I, Appendix.

Hypothesis 4(b) is the same as Hypothesis 2(c). The null hypothesis cannot be rejected with the .05 level of confidence.

Interpretation of Results: Hypothesis 4.

The data would indicate that some weighting of the means of the cells of the discussion and role-playing conditions would be justified. As the complexity of the response increases, the time for that response should also increase. It takes longer to speak a sentence or a phrase than it does to speak a word. The absence of a "weighting" factor in the analysis of time would account for the discrepancy involved with both a high percentage of word responses and a high percentage of time under diadic conditions. The expected relationship should be inverse--the greater the percentage of single word responses, the lower the percentage of time. By weighting the means of the discussion and the role-playing, a more accurate statistical description of the observations can be obtained.

The question of interest here is "Do children verbalize more under some communication patterns than others, and if so, under which patterns." In absolute terms the children appeared to respond more to the diad than to the other communication patterns. The question of the real significance of these responses becomes acute when this observation is related to the high percentage of words and the low percentage of sentences verbalized in the diad. In relative terms the children appeared to verbalize more in the discussion and role-playing situations. Perhaps the real significance here also lies in the observation that these responses tended more to be sentences and phrases.

VI. Observational Data Not Included in Statistical Analysis

Although there are literally hundreds of observations noted by the principal investigator and the research assistant in conducting this study, only a very few of these observations will be reported here. These we feel to be of particular value in interpreting the significance of the data and the study.

1. Perhaps the most significant result of the study is to be measured in interpersonal rather than mathematical terms. When the study began, the school had been in operation approximately four weeks. During this time at least three of the children who appear as S's in this study had not spoken to their teachers. While these children interacted verbally with their peers, they would not speak to the teacher. Converstations with teachers at this school and with a similar school in Holcomb, Kansas, indicate that this is not an unusual phenomenon and that many teachers have such students in their classes during the regular year. The experience with such a child is understandably frustrating for the teacher, who typically "tries every way she knows how" to break down the communication barrier that exists between her and the child. In most instances, however, the problems of the classroom become great and the child is rapidly classified in the teacher's mind as "naughty" or "acting out." In the three cases of such children in the school, all of them spoke directly to the teacher for the first time after completing their first session of a group discussion, and continued to speak to the teacher through the close of the school.

2. The results of this study are confounded by extreme differences in teacher attitudes toward the S's. The attitude differences are not only interpersonal preferences for certain children but reflect racial, ethnic and cultural prejudices. In many instances--probably far more than any of the teachers are aware--the teachers act to inhibit rather than reinforce the development of the child. Striking examples of this appear in the video-recordings. During one session a teacher reached across the table and slapped the hands of one of the S's at the beginning of the session. When he then failed to respond to the verbal task and began to handle some of the objects in front of him, he received another slap on the hands. Another teacher during one of the sessions would repeatedly ask one of the S's to complete the verbal task and before the child could respond would interrupt herself with the statement, "Oh, you don't know, we'll let.....answer," and "Oh, you're stupid, let's let....." These kinds of interactions must have profound effects on the responses of the S's. However, the interactions probably reflect the strengths and weaknesses of the various communication patterns under realistic conditions.

3. Much of the atmosphere of the school, which is nominally designed to increase the verbal ability of the child, is actually oriented toward stiffling the child's natural verbal abilities. From the moment he arrives in the morning until the moment he departs for home, in many of the classes the child is told not to talk in the classroom, to be quiet in the halls, not to talk in the auditorium, etc. This constant pressure for silence would seem to be antithetical to the development and utilization of the natural language of the child.

4. Individual differences within the same S's may sometimes be related to the day of the week in which the child was observed. Many of the children live in homes in which they rotate sleeping on a bed. If the child did not have the bed the night before he was observed, he probably was not fully awake and probably had spent the greater part of his day at the school sleeping at his desk. In many cases the children had had little to eat over a weekend and would be in a state of hunger on Monday and Tuesday. These factors undoubtedly had some effect on the frequency of response under some of the conditions, and would appear to be unrelated to the level of the child's language-speech development or to the observational conditions.

VII. Conclusions

The following conclusions and interpretations of data are offered for consideration.

1. The S population in this study is not a representative sampling of the general population. The S population is primarily a remedial population with large percentages of S's who display problems of bi-lingualism and/or manifest deficiencies in vocabulary in English. The latter characteristic is true for both Anglo and Spanish S's in the population. Extreme caution should be used in generalizing the results of the study to a normal distribution of the population. Before such generalizations can be made, further observations utilizing other minority and low socio-economic populations as well as general populations should be undertaken.

2. The levels of abstraction manifest in the verbalization of children within the observational situation did not differ significantly across the diad and the discussion. The result would lead to the conclusion that a teacher could utilize either the diad or the discussion pattern without significantly affecting the level of abstraction of the verbalization of the children. In teaching situations where classroom time does not permit individualized, diadic interaction between teacher and child the teacher can utilize the group pattern without lowering the level of abstraction at which the child will treat the learning materials.

3. The level of abstraction manifest in the role-playing appears to be structurally related to the communication pattern. The very nature of a "role" appears to place emphasis upon Relational-Contextual responses with most of the responses relating to functional relationships within the role situation. It is predicted that this relationship would hold true for adults as well as for children and that the relationship is therefore not directly related to the development of the language-speech abilities of the child.

4. The fact that all subjects completed the verbal task under all conditions is viewed as particularly significant in view of the report that previous research utilizing the same verbal task had as high as 25% of the S population who were unable to complete the verbal task. It is suggested that the constraints of the formal experimental situation may have acted to block the responses of many of the S's in previous studies. Familiarity with the expectations of the E and reinforcement provided by the presence of other children from the peer group of the S appear to allow the S to verbalize at levels he might not manifest under other conditions.

5. The experience with the three S's who had not spoken to their teachers prior to participation in the first discussion group should be investigated further. It is suggested that such children should be identified in many regular-school classrooms and experimental work with small discussion groups implemented to see if these children will begin active interaction with their teachers. A child who goes through a semester or a year without speaking to the teacher cannot be expected to receive the benefits of normal interaction with the teacher. An effort

should be made to determine whether the effect of the discussion patterns in the three instances reported here were accidental or whether there is a therapeutic dimension to the group pattern which may allow the child to begin normal verbal interaction with his teacher after exposure to small group communication patterns.

6. Despite a previous report by Sigel, Anderson and Shapiro of a significant difference between the responses to actual objects and to pictures of objects, the present investigators were unable to locate any significant differences. The object-picture variable did not appear to vary on either levels of abstraction, complexity of speech response, or length of speech response. The object-picture variable did not vary across the three communication patterns. Further investigation of the relationship between objects and pictures of objects as stimuli for verbal responses should be undertaken considering the importance of this relationship in designing elementary school programs.

7. There appears to be a significant variance between the percentage of the responses which are verbalized as single-words, phrase, and sentence responses across the various communication patterns. The predominant response in the diad was the single-word response. Both the discussion and role-playing patterns displayed significantly higher proportions of phrase and sentence responses. It is suggested that programs which are designed to encourage and develop the complexity of response in the speech of the child should utilize discussion and role-playing patterns rather than the diadic pattern. The constraints of the discussion and role-playing patterns allow for greater free verbalization of sentences and phrases which may then be subject to operant reinforcement.

8. The data presented in this report strongly suggest that many of the assumptions of verbal destitution and underdeveloped language may be based upon a criterion (non-response) which may be highly confounded by factors unrelated to the development of the language-speech facilities of the child. Factors such as the communication pattern under which observations are made and the familiarity with the verbal task appear to be critical factors in the level of abstraction and the complexity of speech response of the child. Future studies which relate to the variables of abstraction and complexity of response should clearly indicate the communication pattern employed and generalizations should be limited to that particular pattern.

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APPENDIX

TABLE I	Observed Cell Means --- Rows are Cells-Columns are Variables
TABLE II	Observed Cell Std. Devs.---Rows are Cells-Columns are Variables
TABLE III	Variance: Within Cells. Used for MS error Terms on Univariate Analyses
TABLE IVa	Sample Correlation Matrices (Including Role Playing Levels of Abstraction
TABLE IVb	Sample Correlation Matrices (Excluding Role Playing Levels of Abstraction

TABLE I

OBSERVED CELL MEANS --- ROWS ARE CELLS-COLUMNS ARE VARIABLES

	1 DESCRIP.	2 REL-CON.	3 CATEGOR.	4 WORD	5 PHRASE	6 SENTES	7 TIME
Diad-Pic.	.182818	.535636	.145227	.607409	.185250	.207250	.130000
Diad-Obj.	.270239	.467935	.109739	.613109	.213152	.173761	.122978
Disc-Pic.	.234000	.533067	.032956	.472556	.250689	.276867	.056756
Disc-Obj.	.226760	.519620	.093680	.465820	.273040	.263560	.069340
Role-Pic.	0.000000	0.000000	0.000000	.366804	.261353	.361529	.077725
Role-Obj.	0.000000	0.000000	0.000000	.617264	.293491	.261792	.122094

TABLE II

OBSERVED CELL STD DEVS--ROWS ARE CELLS-COLUMNS VARIABLES

	1 DESCRIP.	2 REL-CON.	3 CATEGOR.	4 WORD	5 PHRASE	6 SENTES	7 TIME
Diad-Pic.	.327270	.422162	.285269	.203623	.140789	.186580	.109047
Diad-Obj.	.411593	.431782	.224998	.195724	.185408	.195788	.120477
Disc-Pic.	.376103	.452590	.099375	.215992	.199450	.218357	.059108
Disc-Obj.	.360465	.431196	.248643	.205185	.182345	.217964	.087738
Role- Pic.	0.000000	0.000000	0.000000	.208371	.175908	.229000	.047623
Role-Obj.	0.000000	0.000000	0.000000	1.149521	.232446	.221894	.268582

Table III Variance: Within Cells. Used for MS_{error} Terms on Univariate Analyses

VARIABLE	VARIANCE (MS_{error} for univariate analyses)	STANDARD DEVIATION
1 DESCRIP.	.087702	.2961
2 REL-CON	.120765	.3475
3 CATEGOR	.032654	.1807
4 WORD	.277406	.5267
5 PHRASE	.035815	.1892
6 SENTES	.045336	.2129
7 Time	.019646	.1402

D.F. = 283

ERROR TERM FOR ANALYSIS OF VARIANCE (WITHIN CELLS)

SAMPLE CORRELATION MATRICES

Table IVa Including Role Playing Levels of Abstraction

	1 DESCRIP	2 REL-CON	3 CATEGOR	4 WORD	5 PHRASE	6 SENTES	7 TIME
1 DESCRIP	1.000000						
2 REL-CON	-.516482	1.000000					
3 CATEGOR	-.189485	-.207450	1.000000				
4 WORD	-.049719	-.109146	-.004670	1.000000			
5 PHRASE	.227097	-.148796	.050541	.149710	1.000000		
6 SENTES	-.074641	.400084	-.034310	-.327197	-.417499	1.000000	
7 TIME	-.026260	.232291	-.102751	-.040136	-.089340	.208410	1.000000

Table IVb Excluding Role Playing Levels of Abstraction

1 DESCRIP	1.000000						
2 REL-CON	-.516482	1.000000					
3 CATEGOR	-.189485	-.207450	1.000000				
4 WORD	-.159562	-.350278	-.014986	1.000000			
5 PHRASE	.300758	-.197059	.066934	-.431510	1.000000		
6 SENTES	-.096678	.518203	-.044440	-.622975	-.435467	1.000000	
7 TIME	-.047553	.420657	-.186073	-.376930	-.053987	.424348	1.000000